

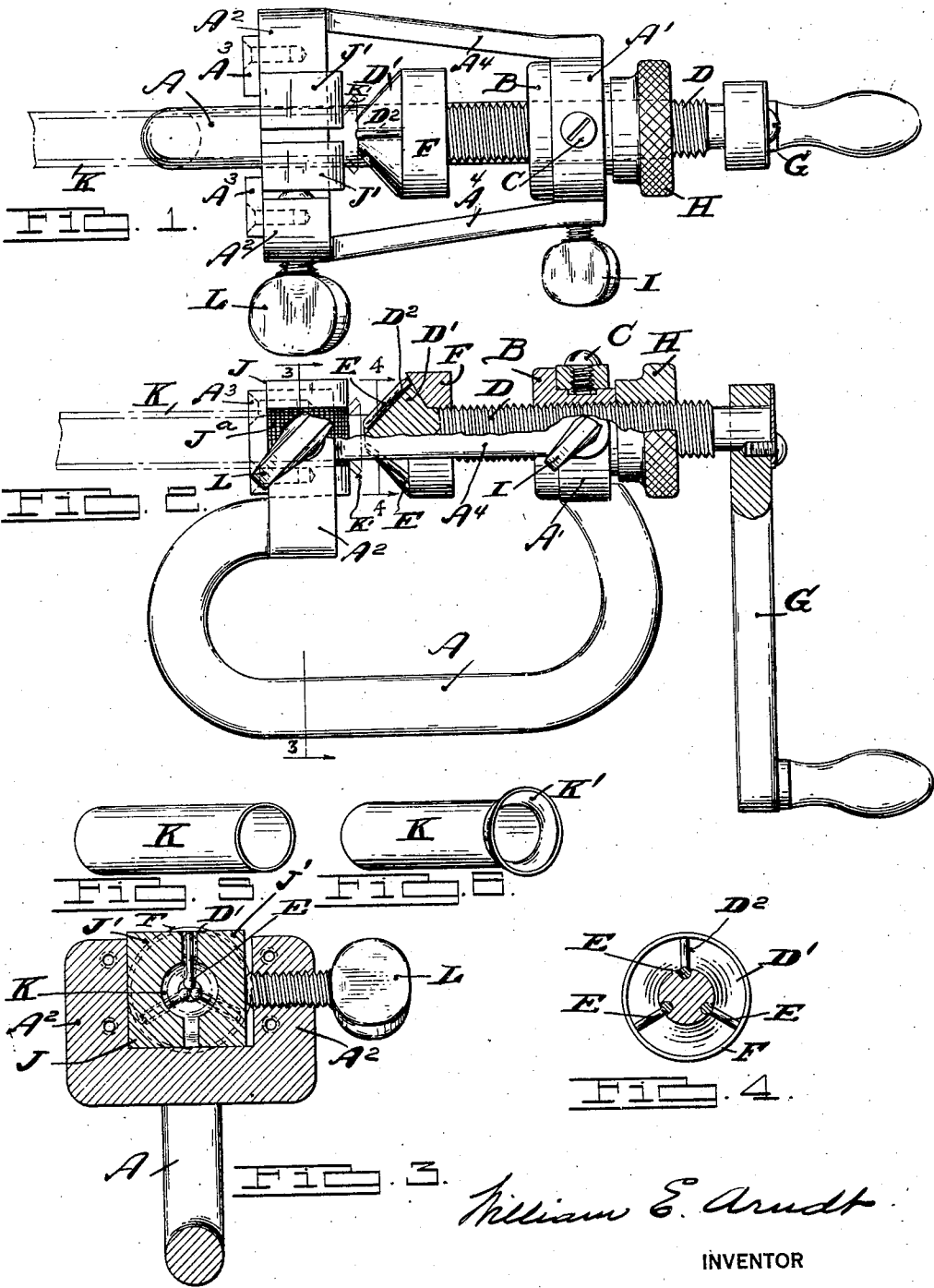
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W. E. ARNDT

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TOOL FOR SPINNING ANGULAR FLANGES ON METAL TUBES

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William E. Arndt

INVENTOR

BY

J. B. Thomas

ATTORNEY

UNITED STATES PATENT OFFICE

WILLIAM E. ARNDT, OF DETROIT, MICHIGAN, ASSIGNOR TO C. M. SMILLIE & COMPANY,
OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN

TOOL FOR SPINNING ANGULAR FLANGES ON METAL TUBES

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My invention relates to a tool for spinning angular flanges on the ends of metal tubes, shown in the accompanying drawings and more particularly pointed out in the following specification and claims.

Heretofore it has been the practice to drive a tapering plug into the end of metal tubes to form the inclined flange which receives the thrust of the coupling nut serving to connect the tube with a pipe fitting. The tube is supported when forming the flange in a perforated block.

The tube supporting block is constructed with a plurality of holes of different diameters corresponding in diameter with that of standardized tubes; the upper portion of the wall surrounding each hole being tapered to receive the flaring end of the tube upon driving the tapering plug into the latter. This method of flanging is a comparatively slow process and frequently terminates in a fracture of the tube due to the metal hardening and crystallizing, caused by pounding the plug into the tube. The loss thus occasioned is considerable and the time required to flare the ends greatly adds to the cost of production.

It is therefore the purpose of the present invention to provide a tool, adapted to quickly flare the ends of tubes of different diameters without danger of fracture,—the flared portion presenting a smooth polished uniform appearance, insuring a tight joint when connected with a pipe fitting.

A further object of the invention is to provide means whereby the flaring operation of the device is controlled by adjustable means adapted to determine and limit the extent of the flared portion of the tube.

With the foregoing and other objects in view which will appear as the description proceeds, the invention further resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes may be made in the precise embodiment of the invention herein disclosed without departing from the spirit of the same.

In the drawings accompanying this specification:

Figure 1 is a plan view of the device, showing a tube in dotted lines as it would appear when "flanged".

Figure 2 is a side elevation of the tool, with parts broken away and in section.

Figure 3 is a cross-sectional view through the tool taken on or about line 3—3 of Figure 2.

Figure 4 is a cross-sectional view of a detail of the device, taken on or about line 4—4 of Figure 2 looking toward the end of the cone-shaped expander and an integral part of the crank actuated screw shaft.

Figure 5 is a perspective view of the tube before forming the inclined flange on its end.

Figure 6 is a perspective view of the tube showing the tapering flange formed on one end of the tube to receive the coupling nut of a pipe union or other fitting.

Referring now to the letters of reference placed upon the drawings:

A denotes a C-shaped casting forming a handle having an integral, annular bearing A¹, projecting outwardly from one end of the handle to receive a screw-tapped bushing B.

C denotes a screw extending through the bearing A¹ into a peripheral groove in the bushing to secure the latter in position.

D denotes a screw shaft supported in the bushing B and provided at its forward end with a cone-shaped head D¹ integral with the shaft. In the inclined face of the cone-shaped head D¹ are a plurality of peripheral bores D² parallel with the inclined face of the head. Lodged in the bores and projecting through an open slot in the head that they may extend above the surface while being held by the overlapping edges of the wall, are a plurality of high grade steel rollers E.

F indicates a nut screwed on the shaft D, having an inclined face bearing against a correspondingly inclined surface at the back of the head D¹ and overlapping the ends of the rollers E to receive the end thrust of the rollers, and to secure the latter against dislodgement.

G indicates a crank arm for manually rotating the screw shaft D. H denotes a nut

mounted on the screw shaft which may be adjusted to limit the forward movement of the shaft when actuated by the crank arm.

I denotes a set-screw projecting through the bearing A¹ adapted to impinge upon the bushing B, to secure it against rotating with the shaft D when the latter is actuated to form a flange on the tubing.

J is a chuck comprising a pair of blocks J¹, J² bored to receive and support a tube K. On the end of the tube K, a flaring flange K¹ is to be formed, to adapt the tube for connection with a pipe or other fitting,—not shown. The blocks forming the chuck J are supported between spaced walls A², A² projecting from the handle A,—of which they are integral part.

L denotes an adjustable set-screw screwed into the wall A², adapted to bear against one of the blocks J¹ of the chuck, whereby upon proper adjustment of the same, the tube is securely gripped between the blocks. The face of the bore of the blocks forming the chuck is knurled as indicated at J² in Figure 2, to assist the gripping action.

A³, A³ are plates secured to and overlapping the opposing edges of the spaced walls A², against which the blocks forming the chuck are adapted to bear. A⁴ are bars connecting the bearing A¹ with the spaced walls A², to stiffen the frame.

Having indicated the several parts by reference letters, the construction and operation of the device will be readily understood.

The pipe to be flanged is supported by the chuck J by the adjustment of the set-screw L. The screw shaft D carrying the cone-shaped head D¹ is then rotated by the crank arm G to a point adjacent the end of the projecting tube. The nut H is then adjusted upon the screw shaft to a position permitting the screw shaft to be rotated sufficiently for the tapering head to enter the tube K, thereby flaring the end of the tube.

The nut H is then adjusted upon the screw shaft D until it contacts with the face of the bearing A¹ thus limiting further rotation and movement of the screw shaft and head in a forward direction. The wingnut I is then released that the bushing B may turn with the screw shaft, which is again manually actuated by the rotation of the crank arm G. It will be obvious that the head D¹ carrying the rollers E may now be rotated burnishing the inner face of the inclined flange of the tube and smoothing its entire surface, thus insuring the production of tubes with smooth uniform flanges.

Having once set the nut H to limit the forward movement of the tapering head D¹ it will not be necessary to readjust it when forming flanges on other tubes of the same diameter.

The set-screw I must be adjusted to secure the bushing against rotation when again ro-

tating the screw shaft to force the head into the end of the tube to produce the flaring flange. The screw I is then released as before that the shaft may be free to rotate and thus permitting the rollers E carried by the head to smooth and burnish the inner face of the flange.

While I have shown tubes formed with outwardly inclined flanges—it will be quite obvious that the device is equally adapted to form an inwardly bent flange upon fitting the screw shaft with a suitably-shaped forming head.

Having thus described my invention, what I claim is:

1. In a device of the character described, a frame; a screw shaft having a cone-shaped head at one end; a screw-tapped bushing rotatable in a bearing provided in the frame for supporting the shaft; a stud supported in the wall of the bearing, extending into a peripheral groove in the wall of the bushing; a set-screw mounted in the wall of the bearing, adapted to secure the bushing against rotation; means for rotating the screw shaft; means for limiting the rotation and forward movement of said screw shaft; and means for gripping and supporting a tube in axial alignment with said cone-shaped head and shaft.

2. In a device of the character described, a frame; a screw shaft having a cone-shaped head at one end; a plurality of rollers housed in bores formed in the cone-shaped head and projecting through slots in its inclined face; a screw-tapped bushing rotatable in a bearing for supporting the shaft; means for securing said bushing in its bearing against rotation with the shaft; means for rotating the screw shaft; means for limiting the rotation and forward movement of the screw shaft; and means for gripping and supporting a tube in axial alignment with said cone-shaped head and shaft.

3. In a device of the character described, a frame; a screw-threaded shaft having a cone-shaped head at one end provided with a plurality of bores parallel with the cone-shaped face of the head; a plurality of rollers respectively journaled in said bores, the periphery of said rollers extending through slots in the inclined face of said head; a nut screwed on said shaft adjacent the head adapted to receive the end thrust of said rollers; a screw-threaded bushing loosely journaled in the frame to receive and support said shaft; means for securing said bushing against rotation when required; means for rotating said shaft; and means for supporting the tube in axial alignment with the cone-shaped head and shaft.

4. In a device of the character described, a frame including a handle; a screw shaft having a cone-shaped head at one end; a plurality of rollers housed in bores formed in the

cone-shaped head and projecting through
slots in its inclined face; a screw-tapped
bushing rotatable in a bearing for support-
ing the shaft; means for securing said bush-
ing in its bearing against rotation with the
5 shaft; means for rotating the screw shaft;
an adjustable nut mounted on said screw
shaft adapted to limit the rotation and for-
ward movement of the screw shaft upon
10 the nut contacting with the end of the bush-
ing; and means for gripping and support-
ing a tube in axial alignment with said cone-
shaped head and shaft.

In testimony whereof, I sign this specifica-
15 tion.

WILLIAM E. ARNDT.

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